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geometrical element of model CAD



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1 [Machine interpretation of CAD data for manufacturing applications](#)



Qiang Ji, Michael M. Marefat

 September 1997 **ACM Computing Surveys (CSUR)**, Volume 29 Issue 3

Publisher: ACM Press

 Full text available: [pdf\(1.90 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Machine interpretation of the shape of a component for CAD databases is an important problem in CAD/CAM, computer vision, and intelligent manufacturing. It can be used in CAD/CAM for evaluation of designs, in computer vision for machine recognition and machine inspection of objects, and in intelligent manufacturing for automating and integrating the link between design and manufacturing. This topic has been an active area of research since the late '70s, and a significant number of computat ...

Keywords: artificial intelligence, automated process planning, computer-aided design, computer-integrated manufacturing, feature recognition, flexible automation

2 ["Modeling Primitives": an object oriented formulation of boundary value problems in a solid geometric modeling context](#)



Taylor C. Wilson, Jeffrey A. Talbert, Jordan J. Cox

 June 1993 **Proceedings on the second ACM symposium on Solid modeling and applications**

Publisher: ACM Press

 Full text available: [pdf\(769.97 KB\)](#)

 Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

3 [Automatic finite-element mesh generation from geometric models—A point-based approach](#)



Y. T. Lee, A. Pennington, N. K. Shaw

 October 1984 **ACM Transactions on Graphics (TOG)**, Volume 3 Issue 4

Publisher: ACM Press

 Full text available: [pdf\(994.11 KB\)](#)

 Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

4 [Deformable curve and surface finite-elements for free-form shape design](#)



George Celniker, Dave Gossard

 July 1991 **ACM SIGGRAPH Computer Graphics, Proceedings of the 18th annual conference on Computer graphics and interactive techniques SIGGRAPH '91**, Volume 25 Issue 4

Publisher: ACM PressFull text available:  [pdf\(4.17 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The finite element method is applied to generate primitives that build continuous deformable shapes designed to support a new free-form modeling paradigm. The primitives autonomously deform to minimize an energy functional subject to user controlled geometric constraints and loads. The approach requires less user input than conventional free-form modeling approaches because the shape can be parameterized independently of the number of degrees of freedom needed to describe the shape. Both a curve ...

5 [Modeling II: Cellular-functional modeling of heterogeneous objects](#)

 Valery Adzhiev, Elena Kartasheva, Toshiyasu Kunii, Alexander Pasko, Benjamin Schmitt
June 2002 **Proceedings of the seventh ACM symposium on Solid modeling and applications**

Publisher: ACM PressFull text available:  [pdf\(387.61 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The paper presents an approach to modeling heterogeneous objects as multidimensional point sets with multiple attributes (hypervolumes). A theoretical framework is based on a hybrid model of hypervolumes combining a cellular representation and a constructive representation using real-valued functions. This model allows for independent but unifying representation of geometry and attributes, and makes it possible to represent dimensionally non-homogeneous entities and their cellular decompositions ...

Keywords: attributes, cellular representation, function representation, heterogeneous models, multidimensional point sets, volume modeling

6 [A constraint-driven solid modeling open environment](#)

 Wenhsyong Lin, Arvid Myklebust
June 1993 **Proceedings on the second ACM symposium on Solid modeling and applications**

Publisher: ACM PressFull text available:  [pdf\(844.88 KB\)](#)Additional Information: [full citation](#), [references](#), [index terms](#)

7 [A small feature suppression/unsuppression system for preparing B-rep models for analysis](#)


 K. Y. Lee, C. G. Armstrong, M. A. Price, J. H. Lamont
June 2005 **Proceedings of the 2005 ACM symposium on Solid and physical modeling**

Publisher: ACM PressFull text available:  [pdf\(2.02 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

CAD technology plays an ever more central role in today's multidisciplinary simulation environments. While this has enabled highly complex and detailed models to be used earlier in the design process it has brought with it difficulties for simulation specialists. Most notably CAD models now contain many details which are irrelevant to simulation disciplines. CAD systems have feature trees which record feature creation but unfortunately this does not capture which features are relevant to which a ...

Keywords: CAD model simplification, Idealisation, analysis model derivation, audit trail, feature reinstatement, feature suppression

8 [Partial entity structure: a compact non-manifold boundary representation based on partial topological entities](#)

 Sang Hun Lee, Kunwoo Lee

May 2001 **Proceedings of the sixth ACM symposium on Solid modeling and applications**

Publisher: ACM Press


Full text available:  pdf(1.06 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Non-manifold boundary representations have gained a great deal of popularity in recent years and various representation schemes have been proposed because they allow an even wider range of objects for various applications than conventional manifold representations. However, since these schemes are mainly interested in describing sufficient adjacency relationships of topological entities, the models represented in these schemes occupy too much storage space redundantly although they are very e ...

Keywords: boundary representation, data structure, geometric modeling, non-manifold, topological entity

9 A computerized design environment for functional modeling of mechanical products

 Y.-M. Deng, S. B. Tor, G. A. Britton

June 1999 **Proceedings of the fifth ACM symposium on Solid modeling and applications**

Publisher: ACM Press

Full text available:  pdf(1.74 MB)

Additional Information: [full citation](#), [references](#), [index terms](#)

Keywords: behavioral scenario, conceptual design techniques, design environment, functional modeling

10 Manufacturing applications: Design and optimization of cellular manufacturing systems: a methodology for developing robotic workcell simulation models

Frank S. Cheng

December 2000 **Proceedings of the 32nd conference on Winter simulation**


Publisher: Society for Computer Simulation International

Full text available:  pdf(200.98 KB)

Additional Information: [full citation](#), [abstract](#), [references](#)

Robotic workcell simulation is a modeling-based problem solving approach developed for the design, analysis, and offline programming of robotic workcells. Current industrial practices show that commercial robotic simulation software packages are able to provide designers with an interactive and virtual environment in which credible solutions for robotic workcell designs can be obtained. However, conducting robotic workcell simulation studies via robotic simulation packages require designers to c ...

11 Constraint based analysis tools for design

 Alfredo Pérez, David Serrano


June 1993 **Proceedings on the second ACM symposium on Solid modeling and applications**

Publisher: ACM Press

Full text available:  pdf(625.46 KB)


Additional Information: [full citation](#), [references](#), [index terms](#)

12 Unified geometric modeling by non-manifold shell operation

 Masatake Higashi, Hideki Yatomi, Yoshihiro Mizutani, Shin-ichi Murabata

June 1993 **Proceedings on the second ACM symposium on Solid modeling and applications**

Publisher: ACM Press

Full text available:  pdf(1.12 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

13 Dimension-independent modeling with simplicial complexes

A. Paoluzzi, F. Bernardini, C. Cattani, V. Ferrucci

January 1993 **ACM Transactions on Graphics (TOG)**, Volume 12 Issue 1**Publisher:** ACM Press

Full text available: pdf(4.91 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#), [review](#)**Keywords:** n-dimensional triangulation, Boolean operations, design languages, extrusion, polyhedra, representation, simplicial complexes, simplicial maps**14** A constraint-based manipulator toolset for editing 3D objects

C. Hsu, G. Alt, Z. Huang, E. Beier, B. Brüderlin

May 1997 **Proceedings of the fourth ACM symposium on Solid modeling and applications****Publisher:** ACM Press

Full text available: pdf(1.71 MB)

Additional Information: [full citation](#), [references](#), [index terms](#)**15** Domain composition methods for associating geometric modeling with finite element modeling

J. J. Cox, W. W. Charlesworth, D. C. Anderson

May 1991 **Proceedings of the first ACM symposium on Solid modeling foundations and CAD/CAM applications****Publisher:** ACM Press

Full text available: pdf(1.18 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)**16** Integrated mechanically based CAE system

Pavel Kagan, Anath Fischer, Pinhas Z. Bar-Yoseph

June 1999 **Proceedings of the fifth ACM symposium on Solid modeling and applications****Publisher:** ACM Press

Full text available: pdf(1.28 MB)

Additional Information: [full citation](#), [references](#), [index terms](#)**Keywords:** B-spline, finite element, integrated CAE system, mechanically based CAD**17** Conceptual graphs in constraint based re-design

O. W. Salomons, F. van Slooten, F. J. A. M. van Houten, H. J. J. Kals

December 1995 **Proceedings of the third ACM symposium on Solid modeling and applications****Publisher:** ACM Press

Full text available: pdf(1.08 MB)

Additional Information: [full citation](#), [references](#), [index terms](#)**Keywords:** CAD, CAPP, conceptual graphs, constraints, features, re-design**18** Some consideration on the data model of geometric data bases

Jinglun Zhang, Renhua Wang

June 1984 **Proceedings of the 21st conference on Design automation**

Publisher: IEEE PressFull text available:  pdf(425.13 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper presents a required geometric model for mechanical parts and proposes a network + relational hybrid data model in the geometric data base system, in which the data structure is based on so called 'Complete Weak Connected Graph' (CWCG) and some new concepts such as 'Entity Type', 'Representation Type' and 'Entity' are put forward. In addition, we introduce a 'Set record' into a set to describe the semantic relation among records. We are trying to make the data model capable of ref ...

19 A hybrid CAD/CAM system for mechanical applications

J. Z. Gingerich, M. P. Carroll, E. J. Chelius, L. P. Kuan

January 1982 **Proceedings of the 19th conference on Design automation****Publisher:** IEEE PressFull text available:  pdf(499.15 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The current wire frame and surface modeling based CAD/CAM systems provide productive tools for the mechanical manufacturing industries. Volumetric modeling, distributed processing, 3-dimensional graphic displays, relational data bases, and less expensive, more powerful computers are emerging technologies sure to benefit CAD/CAM applications. The challenge of the 80's is to integrate the proven CAD/CAM techniques of the 70's with these emerging technologies. This paper addresses the issues i ...

20 Topological design of sculptured surfaces Helaman Ferguson, Alyn Rockwood, Jordan CoxJuly 1992 **ACM SIGGRAPH Computer Graphics , Proceedings of the 19th annual conference on Computer graphics and interactive techniques SIGGRAPH '92**, Volume 26 Issue 2**Publisher:** ACM PressFull text available:  pdf(3.67 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: automorphic functions, boundary value problems, computer-aided design, marked polygon, multiply periodic functions, sculptured surfaces, topology

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